# Computer Architecture and Technology Convergence

# Project 2018

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## Q1: Binary Arithmetic:

Feel free to use any resources you need for the tasks below, but make sure to show workings.

### Q1.1. Question:

Add 11011 to 1011. Show your work (in particular, show where you get carries, and where you don't). You can check your work by translating the numbers into decimal, but I want to see the addition algorithm in base 2 instead of base ten. Hint: You can use MS Word tables to show calculations. Goto Insert->Table to insert a grid of desired size

### Q1.1. Answer

Binary Addition:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Carry |  | 1 |  | 1 | 1 |  |
|  |  | 1 | 1 | 0 | 1 | 1 |
|  |  |  | 1 | 0 | 1 | 1 |
| Sum | 1 | 0 | 0 | 1 | 1 | 0 |

Verification:

|  |  |
| --- | --- |
| Binary | Decimal |
| 11011 | 16+8+0+2+1 = 27 |
| 1011 | 8+0+2+1 = 11 |
| 100110 | 32+0+0+4+2 = 38 |

### Q1.2. Question:

Rewrite the following base-10 numbers as 8-bit two's complement integers: -31, & -59.